

# PHIL 1001: Introduction to Logic (Spring 2017, 4 units)

January 31, 2017

**Instructor:** Prof. Samuel C. Fletcher (scfletch@umn.edu)

**Lectures:** Tu/Th 1:00–2:15 in Anderson 330

**Office Hours:** Tu/Th 11:15–12:15 in Heller 754, and by appointment

**Teaching Assistant:** Michael Calasso (calas005@umn.edu)

**Discussion Sections:** W 1:25–2:15 in Humphrey 60 and W 2:30–3:20 in Blegen 430

**Office Hours:** W 3:30–4:30 in Heller 775, and by appointment

**Teaching Assistant:** Sara Parhizgari (parhi004@umn.edu)

**Discussion Sections:** M 1:25–2:15 in Humphrey 60 and M 2:30–3:20 in Blegen 115

**Office Hours:** W 2:30–3:30 in Heller 773, and by appointment

**Course Website:** <https://ay16.moodle.umn.edu/course/view.php?id=9996>

**Required Text:** Merrie Bergmann, James Moor, and Jack Nelson. *The Logic Book*, 6th ed. New York: McGraw-Hill, 2014. Available at the campus bookstore and on reserve at Wilson library.

**Other Required Materials:** Please bring to every lecture and discussion section paper and either a pencil or a pen in blue or black ink, and to every lecture additionally your i-clicker or a mobile device with the REEF Polling app.

## Description and Objectives

This is an introductory course in formal logic. Just as many of the sciences use mathematics to formally represent systems (whether physical, biological, social, etc.), logic uses a formal language to represent arguments and good patterns of reasoning. And, just as there are many sorts of mathematics, there are many sorts of logic. This course focuses on sentential logic (*SL*) and predicate logic (*PL*). For both of these logical systems, we will cover: their grammar (syntax), how to translate between them and English (symbolization), their notions of meaning and truth (semantics), and their allowed patterns of reasoning (derivations/proofs). By the end of the semester, students will:

1. be familiar with the concept of formality and able to apply its associated techniques to evaluate and analyze arguments using a formal language;

2. identify logical concepts relevant to certain widespread forms of reasoning and inference; and
3. understand some of the strengths and limitations of particular formal systems and tools.

No prerequisites are assumed, but students should be ready to be challenged in lecture to think about arguments in a different way than they may be accustomed. Discussion sections will focus on review of and practice with new concepts and methods introduced.

## Grading

### Basis for Evaluation

**Exams (54%)** There will be *three* closed-book exams: on February 14th, covering chapters 1–3, worth 15% of your grade; on March 30th, covering chapters 5 and 7, worth 15% of your grade; and on May 11th, covering chapters 8 and 10, worth 24% of your grade. Thus, although the exams will not be cumulative, understanding much of the material in the later parts of the course depends on mastering that of the earlier parts. This includes the last exam, which is scheduled for 8:00–10:00 a.m. (as it is during the finals period) and will take place in our usual classroom.

**Homework (33%)** There will be *twelve* homework assignments due at the beginning of class. (See the class schedule at the end of this syllabus for specific due dates.) I prefer that you turn in hard copies, but you may instead turn in digital copies through Moodle. Your lowest homework score will be dropped, so that the remaining assignments are each worth 3% of your grade. You may discuss the homework problems with your classmates but the document you turn in should be your own. Late homeworks will be accepted up to 24 hours after they're due at your TA's office or through Moodle, but with a multiplier of 75% (i.e., the final score on a late homework will be 75% of the regular score). After 24 hours, late homework will not be accepted. Except at the end of semester, your homework will be returned only during your discussion section the week after the homework due date, or by appointment.

**Participation (13%)** In class there will be periodic i-clicker questions that you can use to help test your understanding. There may also be periodic group work, which will be turned in during class. Both the i-clicker questions and group work will be graded for completeness, not correctness. Your two lowest participation scores will be dropped, so each day's participation during the regular term (aside from two exam days) will be worth 0.5% of your grade.

**Extra Credit** For each typo in the textbook, not recorded in the official or supplementary errata, that you find and report to me, you will receive 0.1% extra credit on your grade.

## Understanding Your Letter Grade

How to Compute Your Letter Grade					
	90 > B+ ≥ 87	80 > C+ ≥ 77	70 > D+ ≥ 67		
A ≥ 93	87 > B ≥ 83	77 > C ≥ 73	67 > D ≥ 63	F < 60	
93 > A- ≥ 90	83 > B- ≥ 80	73 > C- ≥ 70	63 > D- ≥ 60		

Grades in the following ranges represent the following corresponding levels of achievement relative to the level necessary to meet course requirements:

**A:** Outstanding.

**B:** Significantly above.

**C:** Adequate in every respect.

**D:** Worthy of credit despite not fully meeting course requirements.

**F:** Not meeting enough course requirements to be deserving of credit.

Students taking this course “pass/fail” will receive an “S,” representing satisfactory achievement, for any standard final letter grade of “C-” or higher that he or she would have been assigned. Such students will receive an “N,” representing unsatisfactory achievement, for any standard final letter grade of “D+” or lower that he or she would have been assigned.

For additional information about University policies about grading and transcripts, please refer to: <http://policy.umn.edu/education/gradingtranscripts>.

## Policies

### Student Conduct Code

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community.

As a student at the University you are expected adhere to Board of Regents Policy: Student Conduct Code. To review the Student Conduct Code, please see: [http://regents.umn.edu/sites/regents.umn.edu/files/policies/Student\\_Conduct\\_Code.pdf](http://regents.umn.edu/sites/regents.umn.edu/files/policies/Student_Conduct_Code.pdf).

Note that the conduct code specifically addresses disruptive classroom conduct, which means “engaging in behavior that substantially or repeatedly interrupts either the instructor’s ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities.”

### Use of Personal Electronic Devices in the Classroom

Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end,

the University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom. (For complete information, please reference: <http://policy.umn.edu/education/studentresp>.)

In this class, the use of laptops, tablets, and other electronic devices is permitted as long as it would not reasonably be a distraction to others. Reasonable distractions include movies and social media. Students violating this policy will be asked to put their offending device away for the rest of the class session, and may also lose participation credit for that day.

## **Scholastic Dishonesty**

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis. (Student Conduct Code: [http://regents.umn.edu/sites/regents.umn.edu/files/policies/Student\\_Conduct\\_Code.pdf](http://regents.umn.edu/sites/regents.umn.edu/files/policies/Student_Conduct_Code.pdf)) If it is determined that a student has cheated, he or she may be given an “F” or an “N” for the course, and may face additional sanctions from the University. For additional information, please see: <http://policy.umn.edu/education/instructorresp>.

The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty: <http://www1.umn.edu/oscai/integrity/student/index.html>. If you have additional specific questions regarding what would constitute scholastic dishonesty in the context of this class, please ask.

## **Makeup Work for Legitimate Absences**

Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. Such circumstances include verified illness, participation in inter-collegiate athletic events, subpoenas, jury duty, military service, bereavement, and religious observances. Such circumstances do not include voting in local, state, or national elections. For complete information, please see: <http://policy.umn.edu/education/makeupwork>.

Under such legitimate circumstances leading a student to be absent for any exam, that student must contact me at least two weeks in advance of the exam, or as soon as possible if the circumstances are known later, to schedule a make-up exam.

## **Appropriate Student Use of Class Notes and Course Materials**

Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions

violate shared norms and standards of the academic community. For additional information, please see: <http://policy.umn.edu/education/studentresp>.

## **Sexual Harassment**

“Sexual harassment” means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual’s work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult the Board of Regents’ policy on the matter: <http://regents.umn.edu/sites/regents.umn.edu/files/policies/SexHarassment.pdf>.

## **Equity, Diversity, Equal Opportunity, and Affirmative Action**

The University provides equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. To this effect, please notify me if you have a preferred name or pronoun not indicated in your official enrollment data. For more information, please consult the Board of Regents’ policy on the matter: [http://regents.umn.edu/sites/regents.umn.edu/files/policies/Equity\\_Diversity\\_EO\\_AA.pdf](http://regents.umn.edu/sites/regents.umn.edu/files/policies/Equity_Diversity_EO_AA.pdf).

## **Disability Accommodations**

The University of Minnesota is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations. If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact the DRC at 612-626-1333 to arrange a confidential discussion regarding equitable access and reasonable accommodations. If you are registered with the DRC and have a current letter requesting reasonable accommodations, please contact me as early in the semester as possible to discuss how the accommodations will be applied in the course. For more information, please see the DRC website, <https://diversity.umn.edu/disability/>.

## **Mental Health and Stress Management**

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: <http://www.mentalhealth.umn.edu>.

## Academic Freedom and Responsibility

Academic freedom is a cornerstone of the University. Within the scope and content of the course as I have defined it, this includes the freedom to discuss relevant matters in the classroom. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study, but they are responsible for learning the content of any course of study for which they are enrolled. Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help, including me, the Philosophy Department Chair Prof. Valerie Tiberius (tiberius@umn.edu), your adviser, or College of Liberal Arts Associate Dean Ana Paula Ferreira (apferrei@umn.edu).

## Tentative Course Schedule

As the section title indicates, the course schedule is open to (reasonable) modification in light of the class's progress. All readings, except this syllabus, are from *The Logic Book*; you are advised to have the reading assigned for a particular day done before that day's lecture. Homework will be posted on the course Moodle site at least one week before it is due.

Date	Topic	Reading	Notes
Tu 1/17	Introduction/What is logic?	Course Syllabus	
Th 1/19	Arguments & Logical Concepts	Ch. 1	
Tu 1/24	<i>SL</i> : Syntax & Symbolization I	Ch. 2.1–2.3	HW #1 due
Th 1/26	<i>SL</i> : Syntax & Symbolization II	Ch. 2.3–2.4	
Tu 1/31	<i>SL</i> : Semantics I	Ch. 3.1–3.2	HW #2 due
Th 2/2	<i>SL</i> : Semantics II	Ch. 3.3–3.6	
Tu 2/7	<i>SL</i> : Derivations I	Ch. 5.1, 5.3	HW #3 due
Th 2/9	<i>SL</i> : Derivations II	Ch. 5.1, 5.3	
Tu 2/14			Exam 1
Th 2/16	<i>SL</i> : Derivations III	Ch. 5.1–5.3	
Tu 2/21	<i>SL</i> : Derivations IV	Ch. 5.4	HW #4 due
Th 2/23	<i>SL</i> : Derivations V	Ch. 5.4	
Tu 2/28	<i>PL</i> : Syntax & Symbolization I	Ch. 7.1–7.2	HW #5 due
Th 3/2	<i>PL</i> : Syntax & Symbolization II	Ch. 7.2–7.3	
Tu 3/7	<i>PL</i> : Syntax & Symbolization III	Ch. 7.3–7.4	
Th 3/9	<i>PL</i> : Syntax & Symbolization IV	Ch. 7.5	HW #6 due
Tu 3/14			Spring Break
Th 3/16			Spring Break
Tu 3/21	<i>PL</i> : Syntax & Symbolization V	Ch. 7.5	
Th 3/23	Review		HW #7 due
Tu 3/28	<i>PL</i> : Semantics I	Ch. 8.1	
Th 3/30			Exam 2
Tu 4/4	<i>PL</i> : Semantics II	Ch. 8.2	

Date	Topic	Reading	Notes
Th 4/6	<i>PL</i> : Semantics III	Ch. 8.3–8.4	HW #8 due
Tu 4/11	<i>PL</i> : Semantics IV	Ch. 8.6	
Th 4/13	<i>PL</i> : Derivations I	Ch. 10.1	HW #9 due
Tu 4/18	<i>PL</i> : Derivations II	Ch. 10.1	
Th 4/20	<i>PL</i> : Derivations III	Ch. 10.1–10.2	HW #10 due
Tu 4/25	<i>PL</i> : Derivations IV	Ch. 10.3	
Th 4/27	<i>PL</i> : Derivations V	Ch. 10.4	HW #11 due
Tu 5/2	<i>PL</i> : Derivations VI	Ch. 10.4	
Th 5/4	Review		HW #12 due
Th 5/11			Exam 3, 8–10 a.m.